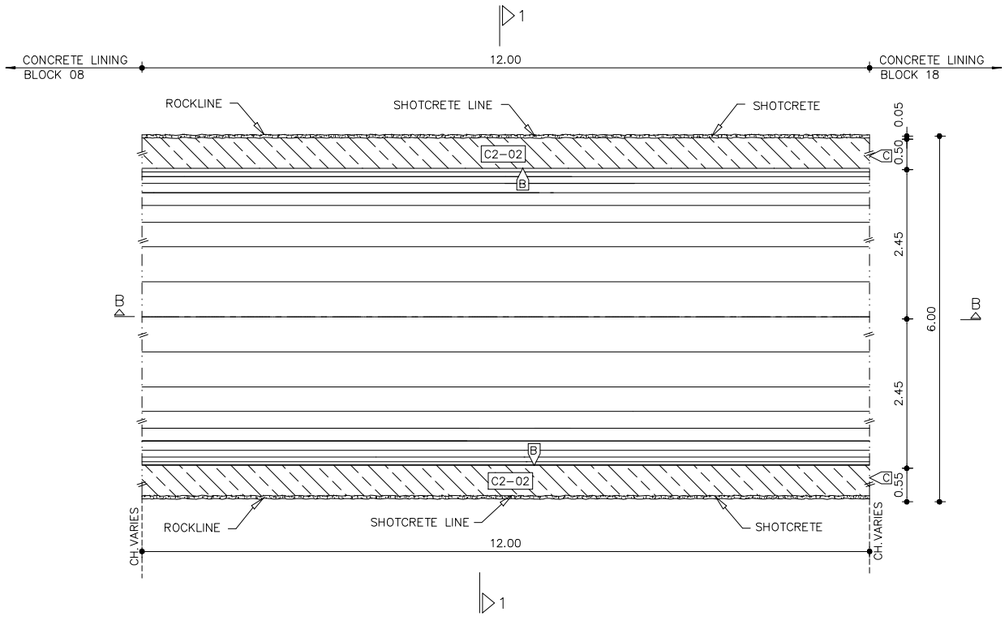
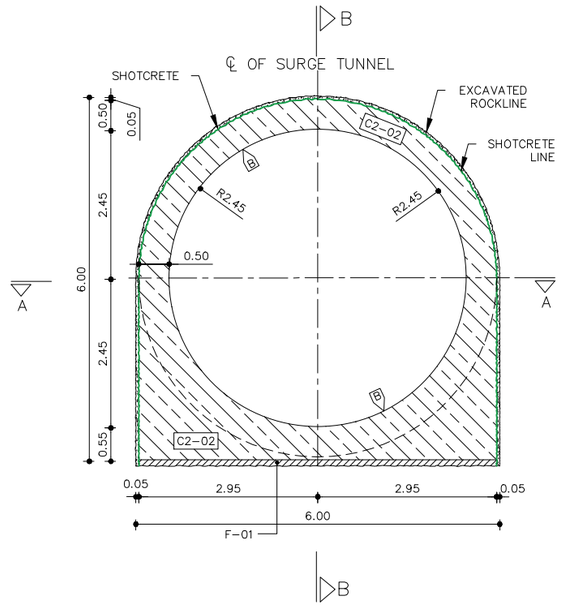


SECTION A–A
BLOCK 09~17
SCALE 1:50



SECTION 1–1
BLOCKS 09~17
SCALE 1:50

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Concrete cover is 8 cm.
4. For Block Plan Refer UTK–032064–ST–CL–BP–01 REV.A.
5. F–01 Quantity As Per Site.

LEGEND:

—//—//— Construction Joint

ABBREVIATION:

E – 01
- 01: CONCRETE PLACEMENT SEQUENCE
- E: CONCRETE CLASS

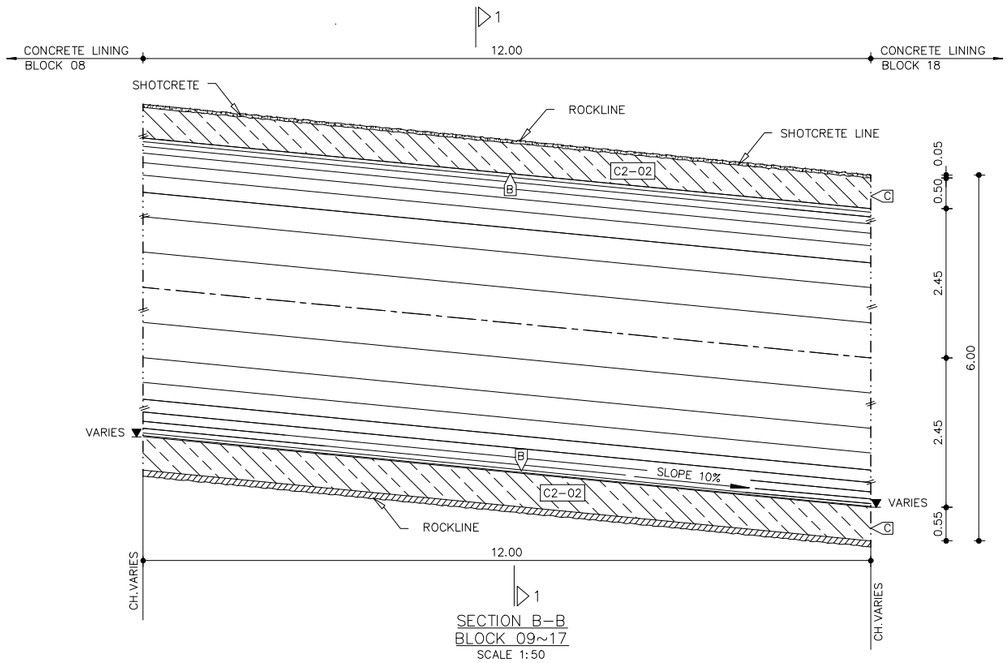
F — BLINDING CONCRETE C12/15

C2 — CONCRETE C30/37

C — SCREEDED FINISH CONCEALED FROM VIEW

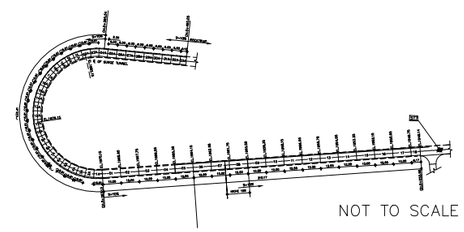
B — EXPOSED TO VIEW OR FLOWING WATER

SCALE 1:50
–0.50 0 0.50 1.00 1.50 2.00 2.50 [m]



SECTION B–B
BLOCK 09~17
SCALE 1:50

KEYPLAN



NOT TO SCALE

FORMWORK CALCULATION FOR BLOCK 09~17								
CONCRETE CLASS – PLACEMENT NO.	FINISHING CLASS	FORM WORK						REMARK
		LENGTH(m)	HEIGHT(m)	NOS	AREA (m2)	NO. OF BLOCK	TOTAL AREA (m2)	
C2 – 02	B	15.39	12	1.00	184.68	9	1662.12	CIRCUMFERENCE=15.39m
	C	12.50		1.00	12.50	9	112.50	X–AREA=12.50 m2

CONCRETE FEATURES FOR BLOCK 09~17										
CONCRETE CLASS–PLACEMENT NO.	CONCRETE									REMARK
	LENGTH(m)	BREADTH(m)	HEIGHT(m)	CALC. VOLUME (m3)	ADDED VOLUME (m3)	DEDUCTED VOLUME (m3)	ACTUAL VOLUME (m3)	NO. OF BLOCK	TOTAL VOLUME (m3)	
C2 – 02	12	12.50		150.00	0.00	0.00	150.00	9	1350.00	X–AREA=12.50 m2

Reference Drawings

Drwg. No.	Title
UTK–012065–4520–S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK–012065–4520–Q–011–F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK–012065–4520–S–012–D	HRT To Surge Tunnel,Cross Section
UTK–012065–4520–w 010–A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

Name	Date	Notes

☐ Approved ☐ Approved as noted ☐ Return for correction ☐ For Information

DATE: ..... SIGNATURE: .....
ENGINEER – JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

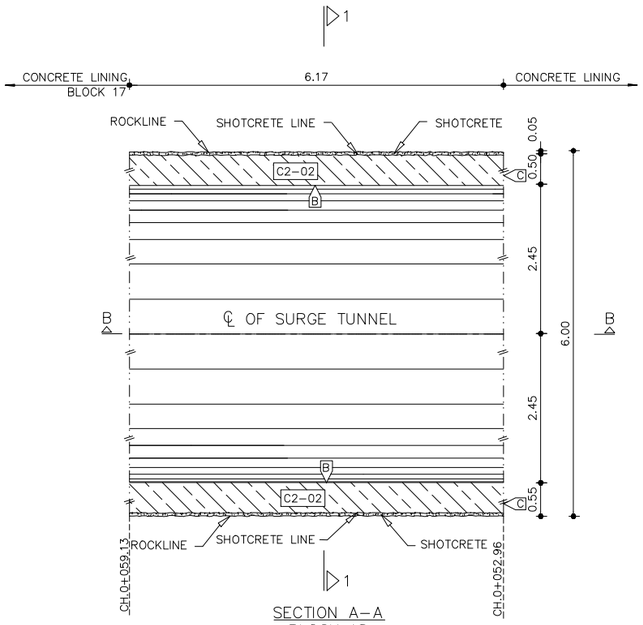
ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

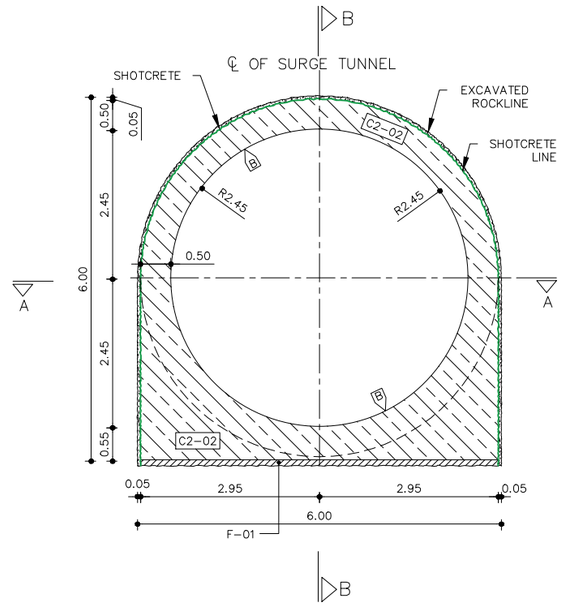
Contractor:				Drwg. Ref. :
	Cad. Sign.	Orig.Sign.	Date	SURGE TUNNEL
Drawn	Jan Jiwan		09.03.2019	CONCRETE LINING
Checked	S. Gautam			BLOCK 09~17
Verified				CH.0+167.13~CH.0+059.13
Approved	Sheng D.F.			FORMWORK EXECUTION DRAWING

Scale A1 1:50
Scale A3 1:100

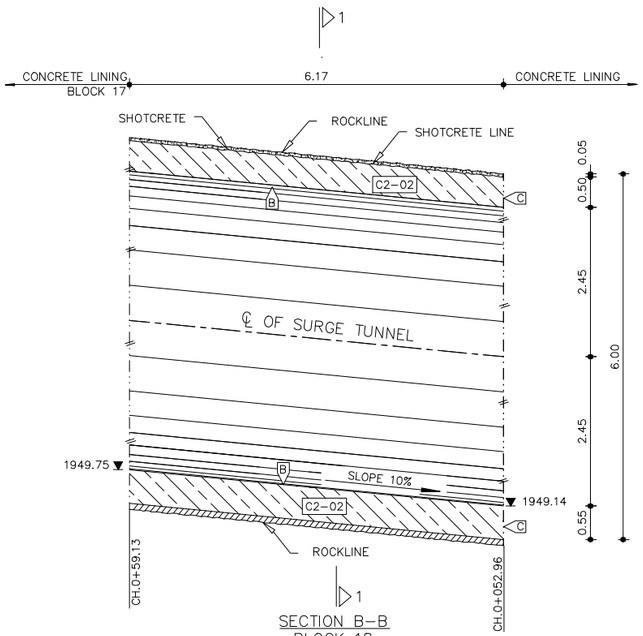
Drwg. No.: UTK–032064–ST–CL– C–0901 REV.



SECTION A–A
BLOCK 18
SCALE 1:50



SECTION 1–1
BLOCKS 18
SCALE 1:50



SECTION B–B
BLOCK 18
SCALE 1:50

NOTES:

1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Concrete cover is 8 cm.
4. For Block Plan Refer UTK–032064–ST–CL–BP–01 REV.A.
5. F–01 Quantity As Per Site.

LEGEND:

—//—//— Construction Joint

ABBREVIATION:

E – 01
- 01: CONCRETE PLACEMENT SEQUENCE
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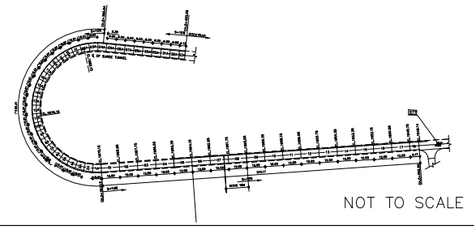
C — SCREEDED FINISH CONCEALED FROM VIEW

B — EXPOSED TO VIEW OR FLOWING WATER

SCALE 1:50
–0.50 0 0.50 1.00 1.50 2.00 2.50 [m]

KEYPLAN



NOT TO SCALE

FORMWORK CALCULATION FOR BLOCK 18

CONCRETE CLASS – PLACEMENT NO.	FINISHING CLASS	FORM WORK						REMARK
		LENGTH(m)	HEIGHT(m)	NOS	AREA (m2)	NO. OF BLOCK	TOTAL AREA (m2)	
C2 – 02	B	15.39	6.17	1.00	94.95	1	94.95	CIRCUMFERENCE=15.39m
	C	12.50		1.00	12.50	1	12.50	X–AREA=12.50 m2

CONCRETE FEATURES FOR BLOCK 18

CONCRETE CLASS– PLACEMENT NO.	CONCRETE									REMARK
	LENGTH(m)	BREADTH(m)	HEIGHT(m)	CALC. VOLUME (m3)	ADDED VOLUME (m3)	DEDUCTED VOLUME (m3)	ACTUAL VOLUME (m3)	NO. OF BLOCK	TOTAL VOLUME (m3)	
C2 – 02	6.17	12.50		77.125	0.00	0.00	77.125	1	77.125	X–AREA=12.50 m2

Reference Drawings

Drwg. No.	Title
UTK–012065–4520–S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK–012065–4520–Q–011–F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK–012065–4520–S–012–D	HRT To Surge Tunnel,Cross Section
UTK–012065–4520–w 010–A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

Name	Date	Notes

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ENGINEER – JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		09.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

Drwg. Ref. :

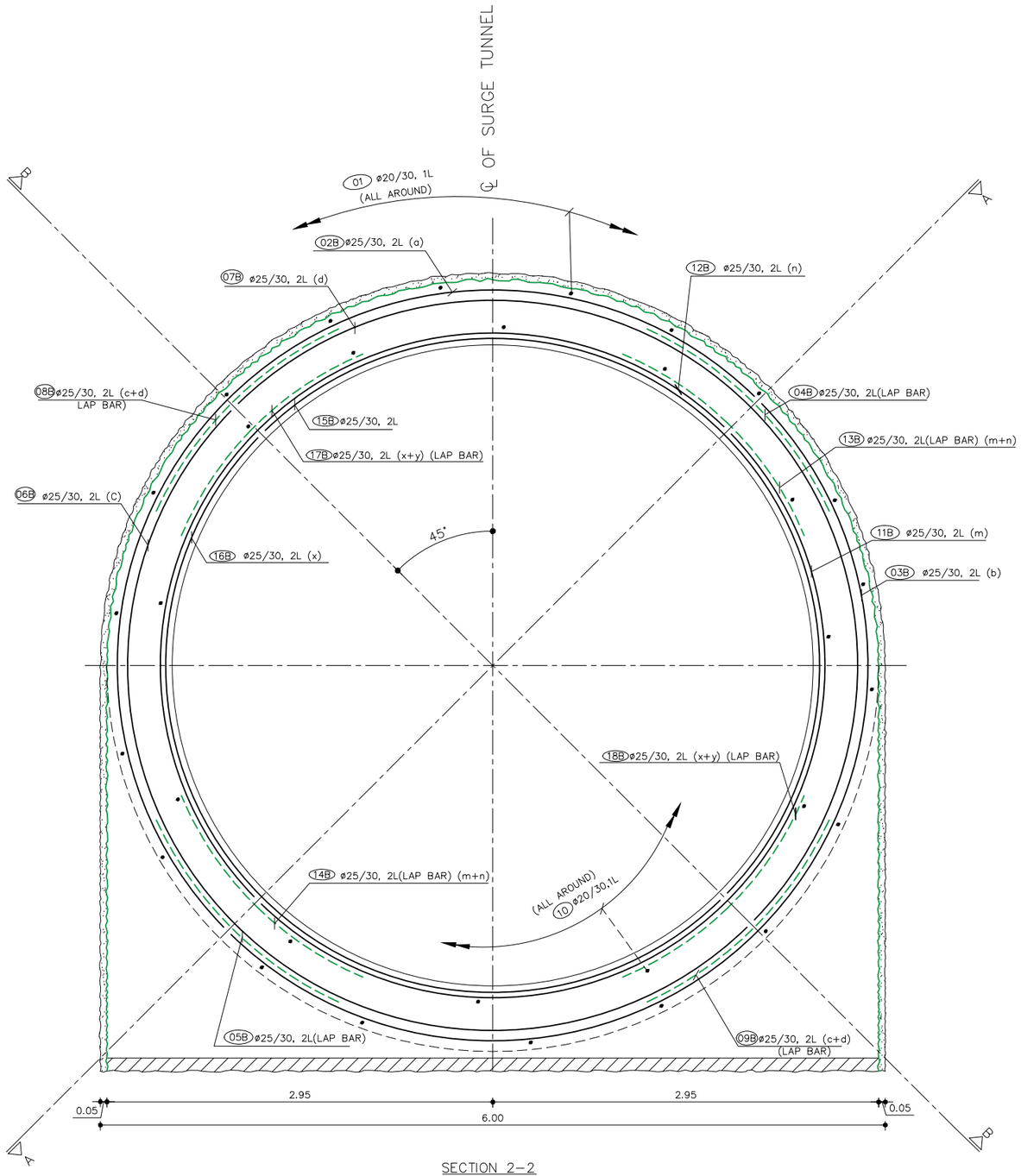
SURGE TUNNEL
CONCRETE LINING
BLOCK 18
CH.0+059.13~CH.0+052.96
FORMWORK EXECUTION DRAWING

Scale A1 1:50
Scale A3 1:100

Drwg. No.: UTK–032064–ST–CL– C–1801 REV.

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK-032064-ST-CL-BP-01 Rev-A for block plan.

LEGEND:
-//-//- Construction Joint
—■— Coupler



SECTION 2-2
BLOCK 11
SCALE 1:20

SCALE 1:20
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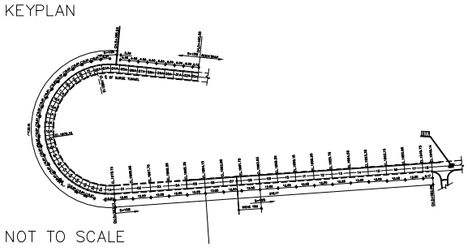
KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

	Name	Date	Notes

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UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		09.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

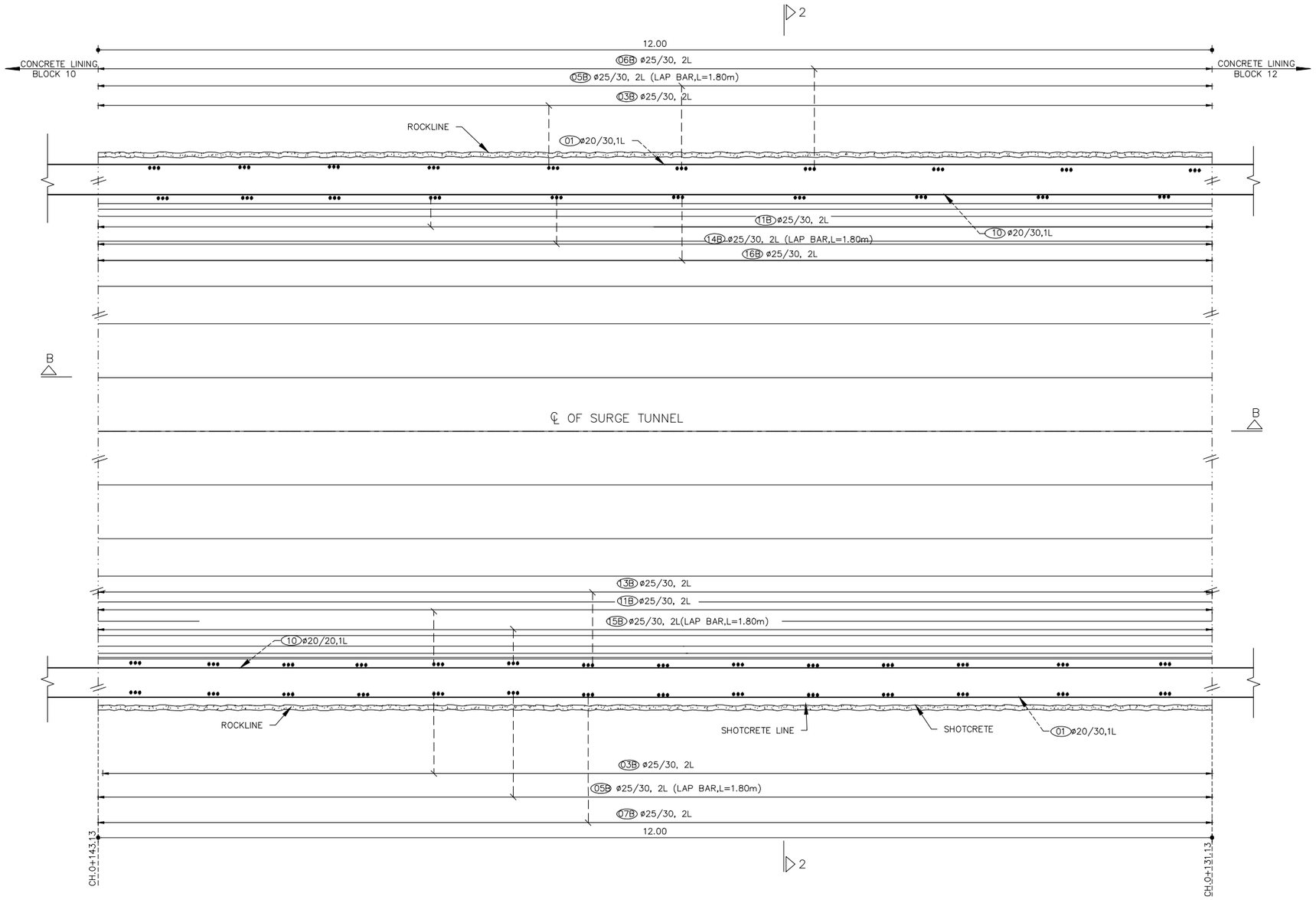
Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCK 11
CH.0+143.13~CH.0+131.13
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:20
Scale A3 1:40

Drwg. No.: UTK-032064-ST-CL- R-1101 REV.

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK-032064-ST-CL-BP-01 Rev-A for block plan.

LEGEND:
-//-//- Construction Joint
—■— Coupler



SECTION A-A
BLOCK 11
SCALE 1:25

SCALE 1:20
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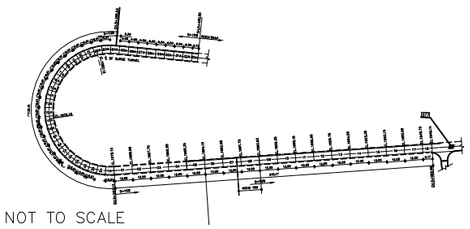
KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

	Name	Date	Notes

☐ Approved ☐ Approved as noted ☐ Return for correction ☐ For Information

DATE: ..... SIGNATURE: .....
ENGINEER - JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

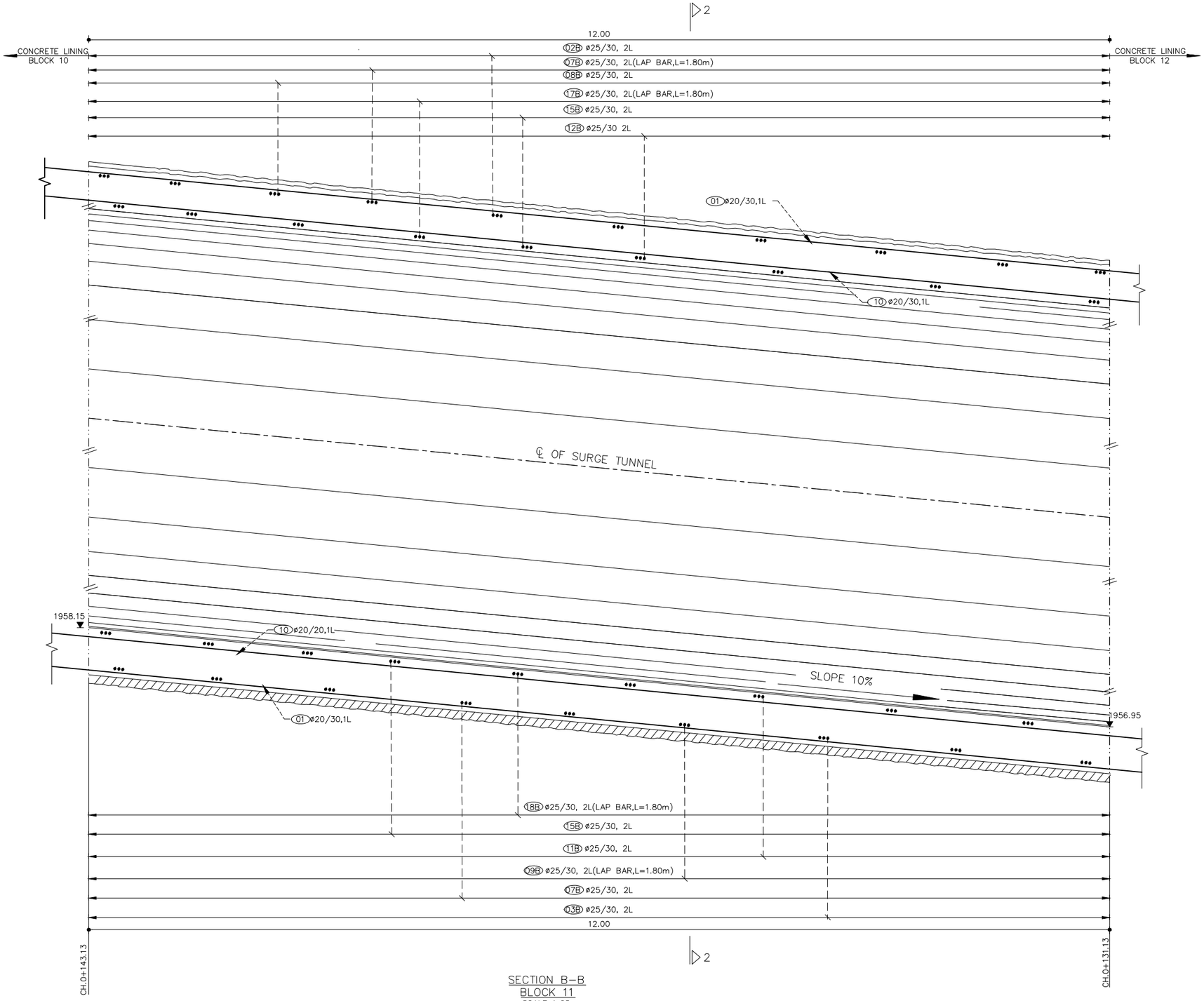
UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

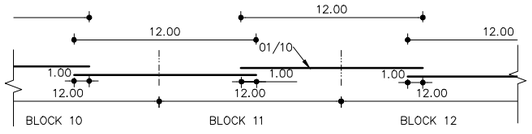
	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		09.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCK 11
CH.0+143.13~CH.0+131.13
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:20
Scale A3 1:40
Drwg. No.: UTK-032064-ST-CL- R-1102 REV.



SECTION B–B
BLOCK 11
SCALE 1:25



BAR 01/10
1ST LAYER

NOTES:

1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK–032064–ST–CL–BP–01A Rev–A for block plan.

LEGEND:

–//–//– Construction Joint
—■— Coupler

SCALE 1:25
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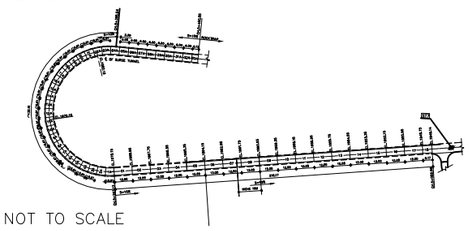
KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK–012065–4520–S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK–012065–4520–Q–011–F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK–012065–4520–S–012–D	HRT To Surge Tunnel,Cross Section
UTK–012065–4520–w 010–A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

Name	Date	Notes

☐ Approved ☐ Approved as noted ☐ Return for correction ☐ For Information

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ENGINEER – JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		09.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCK 11
CH.0+143.13~CH.0+131.13
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:25
Scale A3 1:50

Drwg. No.: UTK–032064–ST–CL– R–1103 REV.

BAR BENDING SCHEDULE OF BLOCK 11

Bar No.	Steel size (mm)	Shape (cm)	Clear Length (cm)	Numbers	Couplers/ Laps Nos	Total Length (m)	Weight (kg/m)	Total Weight (kg/block)	No. of block	Total Weight (kg)	Remarks
01	20	1200	1200	61	61 nos of laps	732.00	2.47	1808.04	1	1808.04	30cm SPACING
02B	25	900 R=288.00 ∠=179.00°	900	41		369.00	3.86	1424.34	1	1424.34	30cm SPACING
03B	25	900 R=288.00 ∠=179.00°	900	41		369.00	3.86	1424.34	1	1424.34	30cm SPACING
04B	25	180 R=288.00 ∠=36.00°	180	41		73.80	3.86	284.87	1	284.87	LAP BAR 30cm SPACING
05B	25	180 R=288.00 ∠=36.00°	180	41		73.80	3.86	287.87	1	284.87	LAP BAR 30cm SPACING
06B	25	900 R=288.00 ∠=179.00°	900	41		369.00	3.86	1424.34	1	1424.34	30cm SPACING
07B	25	900 R=288.00 ∠=179.00°	900	41		369.00	3.86	1424.34	1	1424.34	30cm SPACING
08B	25	180 R=288.00 ∠=36.00°	180	41		73.80	3.86	284.87	1	284.87	LAP BAR 30cm SPACING
09B	25	180 R=288.00 ∠=36.00°	180	41		73.80	3.86	284.87	1	284.87	LAP BAR 30cm SPACING
10	20	1200	1200	53	53 nos of laps	636.00	2.47	1570.92	1	1570.92	30cm SPACING

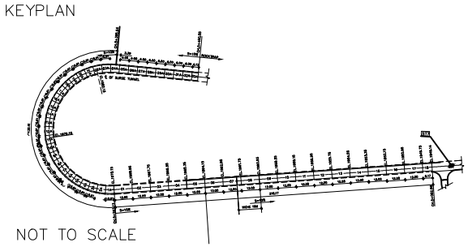
BAR BENDING SCHEDULE OF BLOCK 11

Bar No.	Steel size (mm)	Shape (cm)	Clear Length (cm)	Numbers	Couplers/ Laps	Total Length (m)	Weight (kg/m)	Total Weight (kg/block)	No. of block	Total Weight (kg)	Remarks
11B	25	795 R=253.00 ∠=180.00°	795	41		325.95	3.86	1258.17	1	1258.17	30cm SPACING
12B	25	795 R=253.00 ∠=180.00°	795	41		325.95	3.86	1258.17	1	1258.17	30cm SPACING
13B	25	180 R=253.00 ∠=41.00°	180	41		73.80	3.86	284.87	1	284.87	LAP BAR 30cm SPACING
14B	25	180 R=253.00 ∠=41.00°	180	41		73.80	3.86	284.87	1	284.87	LAP BAR 30cm SPACING
15B	25	795 R=253.00 ∠=180.00°	795	41		325.95	3.86	1258.17	1	1258.17	30cm SPACING
16B	25	795 R=253.00 ∠=180.00°	795	41		325.95	3.86	1258.17	1	1258.17	30cm SPACING
17B	25	180 R=253 ∠=41.00°	180	41		73.80	3.86	284.84	1	284.87	LAP BAR 30cm SPACING
18B	25	180 R=258.30 ∠=41.00°	180	41		73.80	3.86	284.87	1	284.87	LAP BAR 30cm SPACING

SUMMARY OF BAR BENDING QUANTITY FOR SURGE TUNNEL BLOCK 11

Steel size (mm)	Total weight (kg)	Numbers			Weight (kg/no.)			Total Wt.(kg)
		Lap	Coupler	Coupler /Lap for Chair/ spacers	Lap	Coupler	Chair/ spacers	Excl. lap /chair/ spacer
20	3378.96	114	–	–	281.58	–	–	3097.38
25	13009.00							13009.00
Total	16387.96							16106.38

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK–012065–4520–S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK–012065–4520–Q–011–F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK–012065–4520–S–012–D	HRT To Surge Tunnel,Cross Section
UTK–012065–4520–w 010–A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

	Name	Date	Notes

☐ Approved ☐ Approved as noted ☐ Return for correction ☐ For Information

DATE: ..... SIGNATURE: .....
ENGINEER – JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL | CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		09.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

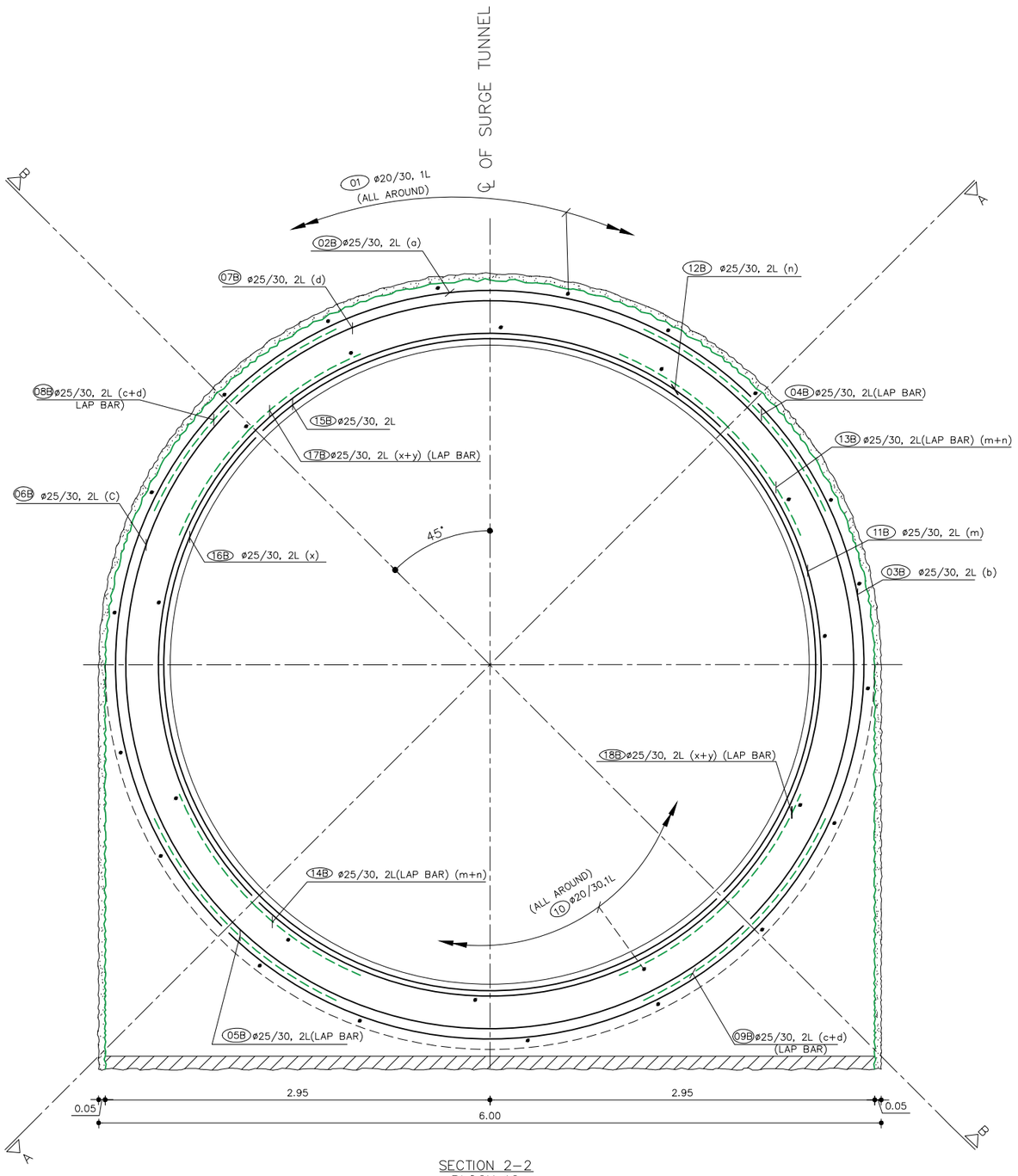
Drwg. Ref. :

SURGE TUNNEL
CONCRETE LINING
BLOCK 11
CH.0+143.13~CH.0+131.13
REINFORCEMENT EXECUTION DRAWING

NOT TO SCALE | Drwg. No.: UTK–032064–ST–CL– BS–1101 | REV.

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK-032064-ST-CL-BP-01 Rev-A for block plan.

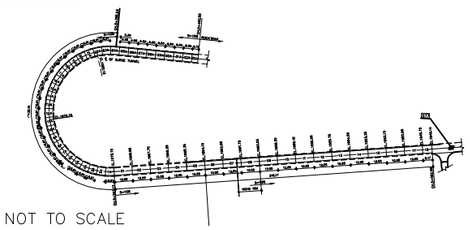
LEGEND:
-//-//- Construction Joint
—■— Coupler



SECTION 2-2
BLOCK 12
SCALE 1:20

SCALE 1:20
-0.20 0 0.20 0.40 0.60 0.80 1.00 [m]

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

	Name	Date	Notes

☐ Approved ☐ Approved as noted ☐ Return for correction ☐ For Information

DATE: ..... SIGNATURE: .....
ENGINEER - JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		09.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

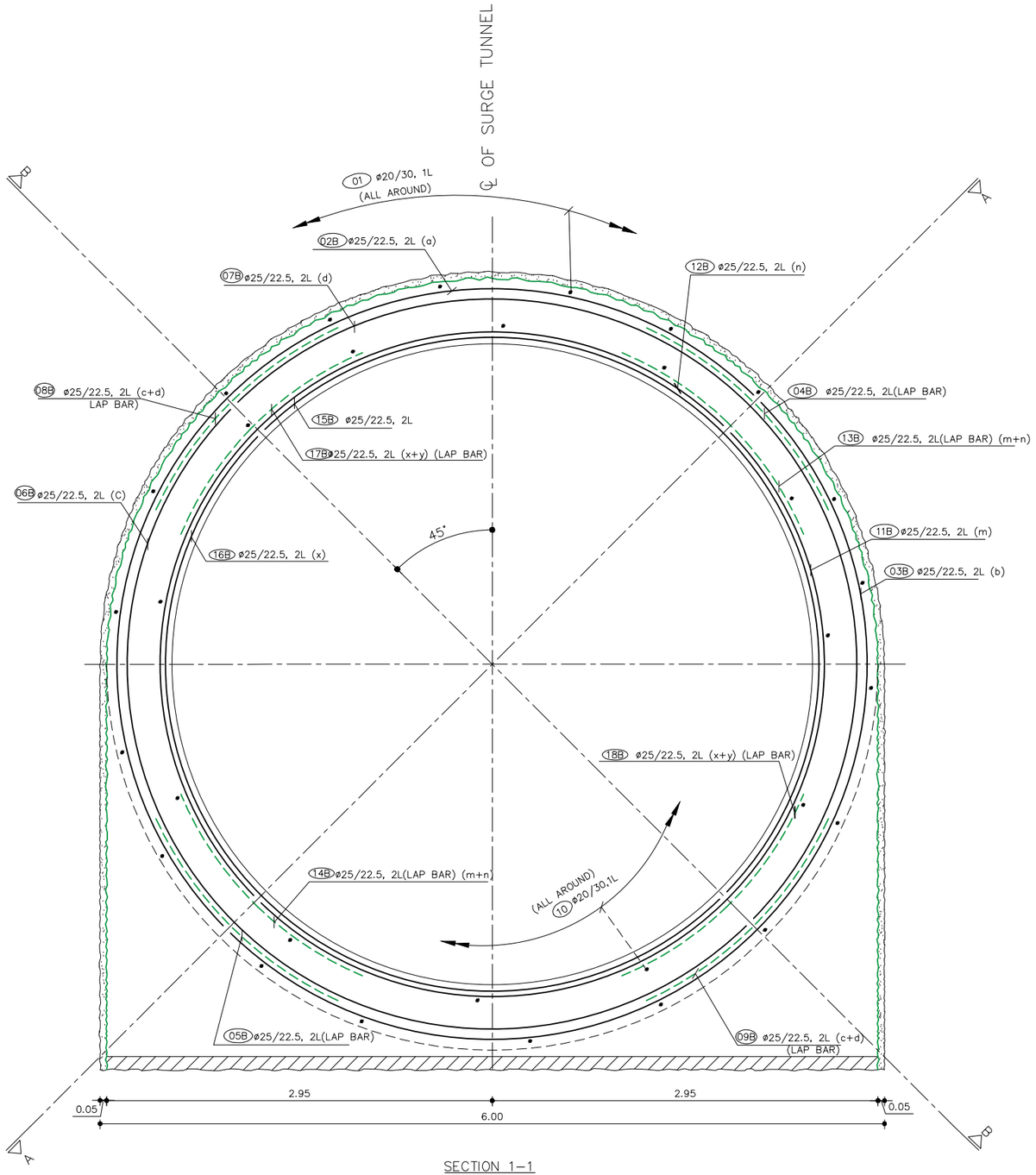
Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCK 12
CH.0+131.13~CH.0+119.13
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:20
Scale A3 1:40

Drwg. No.: UTK-032064-ST-CL- R-1201 REV.

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK-032064-ST-CL-BP-01 Rev-A for block plan.

LEGEND:
-//-//- Construction Joint
—■— Coupler



SECTION 1-1
BLOCK 12
SCALE 1:20

SCALE 1:25
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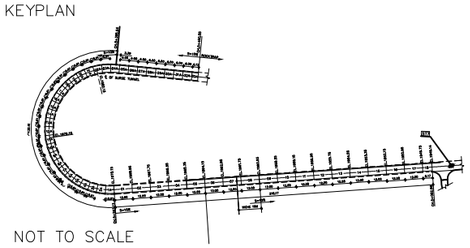
KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

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Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
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Contractor:

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Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

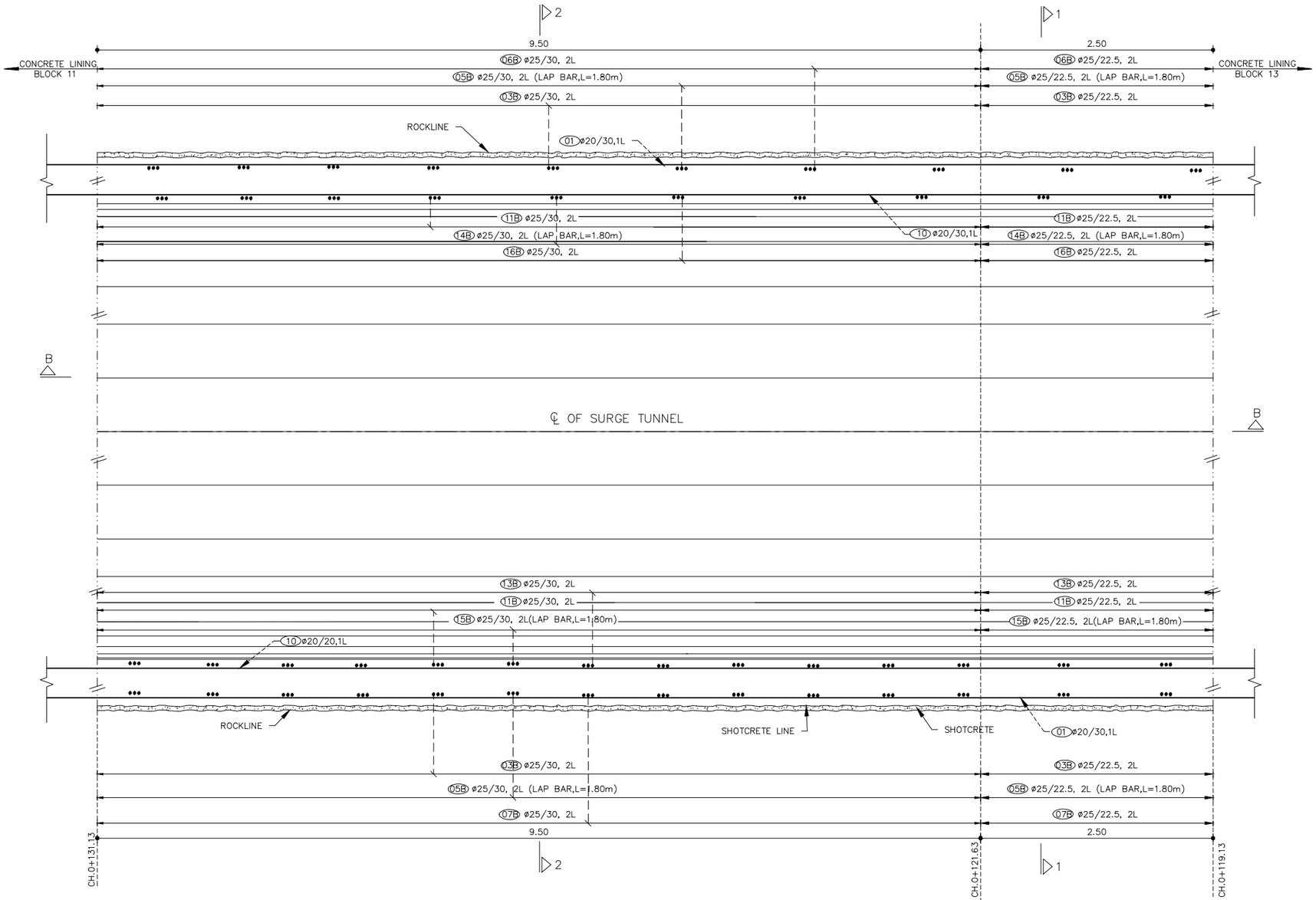
Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCK 12
CH.0+131.13~CH.0+119.13
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:25
Scale A3 1:50

Drwg. No.: UTK-032064-ST-CL- R-1202 REV.

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK-032064-ST-CL-BP-01 Rev-A for block plan.

LEGEND:
-//-//- Construction Joint
Coupler



SECTION A-A
BLOCK 12
SCALE 1:25

SCALE 1:25
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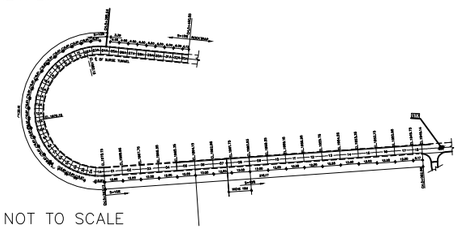
KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

	Name	Date	Notes

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UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
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UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

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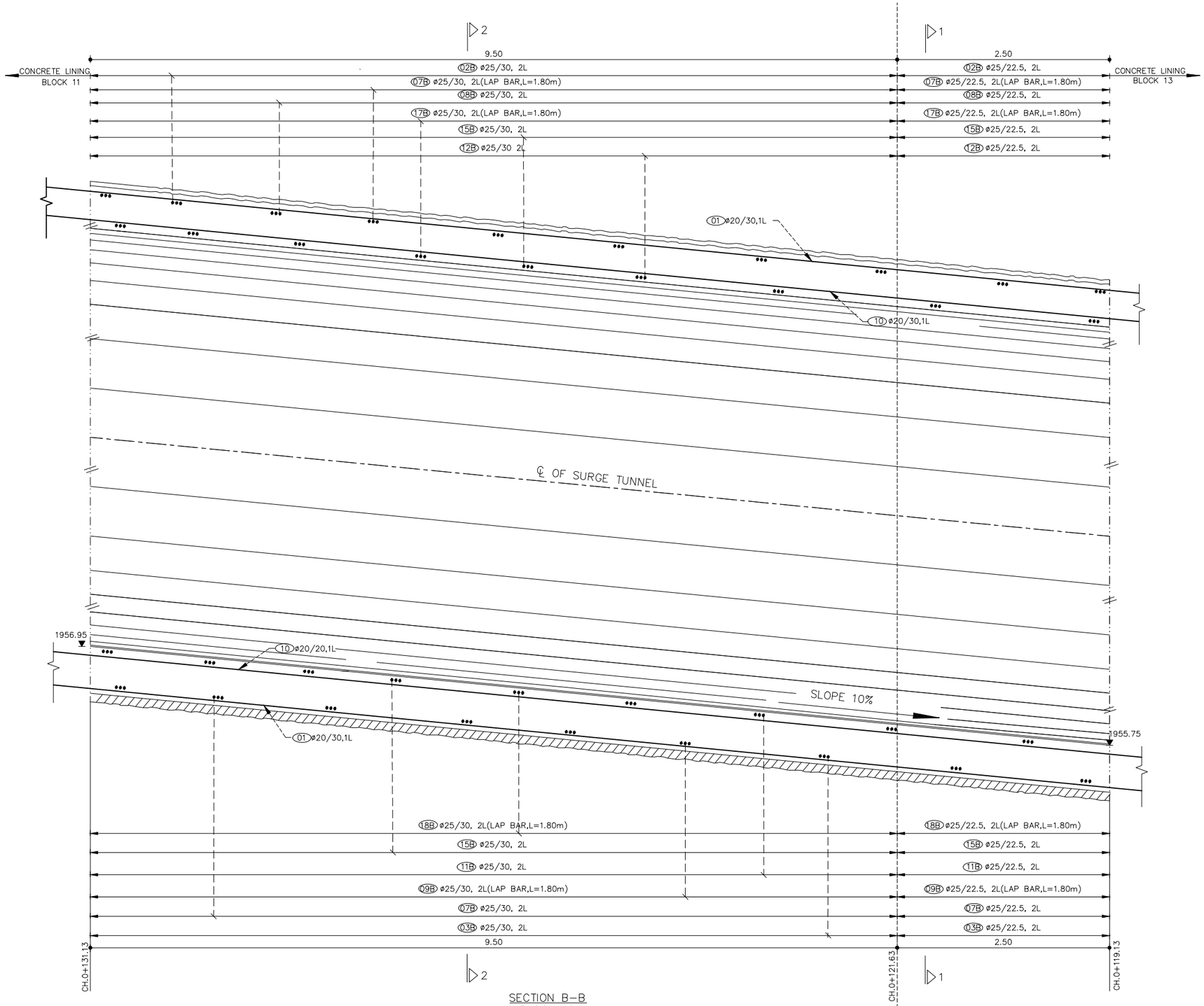
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

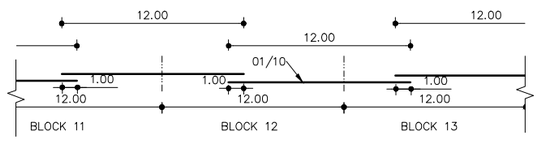
Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCK 12
CH.0+131.13~CH.0+119.13
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:25
Scale A3 1:50

Drwg. No.: UTK-032064-ST-CL- R-1203 REV.



SECTION B–B
BLOCK 12
SCALE 1:25



BAR 01/10
1ST LAYER

NOTES:

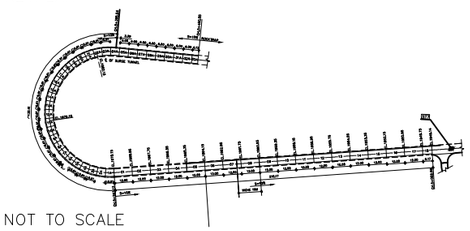
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK–032064–ST–CL–BP–01A Rev–A for block plan.

LEGEND:

–//–//– Construction Joint
—■— Coupler

SCALE 1:25
–0.25 0 0.25 0.50 0.75 1.00 1.25 [m]

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK–012065–4520–S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK–012065–4520–Q–011–F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK–012065–4520–S–012–D	HRT To Surge Tunnel,Cross Section
UTK–012065–4520–w 010–A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

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UPPER TAMAKOSHI HYDROPOWER LIMITED
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UTKHPL

ENGINEER JV NL
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UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

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Drawn	Jan Jiwan		09.03.2019
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Verified			
Approved	Sheng D.F.		

Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCK 12
CH.0+131.13~CH.0+119.13
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:25
Scale A3 1:50

Drwg. No.: UTK–032064–ST–CL– R–1204 REV.

BAR BENDING SCHEDULE OF BLOCK 12

Bar No.	Steel size (mm)	Shape (cm)	Clear Length (cm)	Numbers	Couplers/ Laps Nos	Total Length (m)	Weight (kg/m)	Total Weight (kg/block)	No. of block	Total Weight (kg)	Remarks
01	20	1200	1200	61	61 nos of laps	732.00	2.47	1808.04	1	1808.04	
02B	25	900 R=288.00 ∠=179.00°	900	32+11		387.00	3.86	1493.82	1	1493.82	
03B	25	900 R=288.00 ∠=179.00°	900	32+11		387.00	3.86	1493.82	1	1493.82	
04B	25	180 R=288.00 ∠=36.00°	180	32+11		77.40	3.86	298.76	1	298.76	
05B	25	180 R=288.00 ∠=36.00°	180	32+11		77.40	3.86	298.76	1	298.76	
06B	25	900 R=288.00 ∠=179.00°	900	32+11		387.00	3.86	1493.82	1	1493.82	
07B	25	900 R=288.00 ∠=179.00°	900	32+11		387.00	3.86	1493.82	1	1493.82	
08B	25	180 R=288.00 ∠=36.00°	180	32+11		77.40	3.86	298.76	1	298.76	
09B	25	180 R=288.00 ∠=36.00°	180	32+11		77.40	3.86	298.76	1	298.76	
10	20	1200	1200	53	53 nos of laps	636.00	2.47	1570.92	1	1570.92	

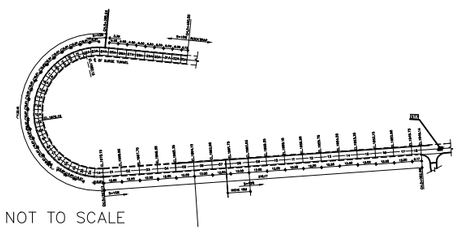
BAR BENDING SCHEDULE OF BLOCK 12

Bar No.	Steel size (mm)	Shape (cm)	Clear Length (cm)	Numbers	Couplers/ Laps	Total Length (m)	Weight (kg/m)	Total Weight (kg/block)	No. of block	Total Weight (kg)	Remarks
11B	25	795 R=253.00 ∠=180.00°	795	32+11		341.85	3.86	1319.54	1	1319.54	
12B	25	795 R=253.00 ∠=180.00°	795	32+11		341.85	3.86	1319.54	1	1319.54	
13B	25	180 R=253.00 ∠=41.00°	180	32+11		77.40	3.86	298.76	1	298.76	
14B	25	180 R=253.00 ∠=41.00°	180	32+11		77.40	3.86	298.76	1	298.76	
15B	25	795 R=253.00 ∠=180.00°	795	32+11		341.85	3.86	1319.54	1	1319.54	
16B	25	795 R=253.00 ∠=180.00°	795	32+11		341.85	3.86	1319.54	1	1319.54	
17B	25	180 R=253 ∠=41.00°	180	32+11		77.40	3.86	298.76	1	298.76	
18B	25	180 R=258.30 ∠=41.00°	180	32+11		77.40	3.86	298.76	1	298.76	

SUMMARY OF BAR BENDING QUANTITY FOR SURGE TUNNEL BLOCK 12

Steel size (mm)	Total weight (kg)	Numbers			Weight (kg/no.)			Total Wt.(kg)
		Lap	Coupler	Coupler /Lap for Chair/ spacers	Lap	Coupler	Chair/ spacers	Excl. lap /chair/ spacer
20	3378.96	114	–	–	281.58	–	–	3097.38
25	13643.52							13643.52
Total	17022.48							16740.90

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

Name	Date	Notes

☐ Approved ☐ Approved as noted ☐ Return for correction ☐ For Information

DATE: ..... SIGNATURE: .....
ENGINEER – JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		09.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

Drwg. Ref. :

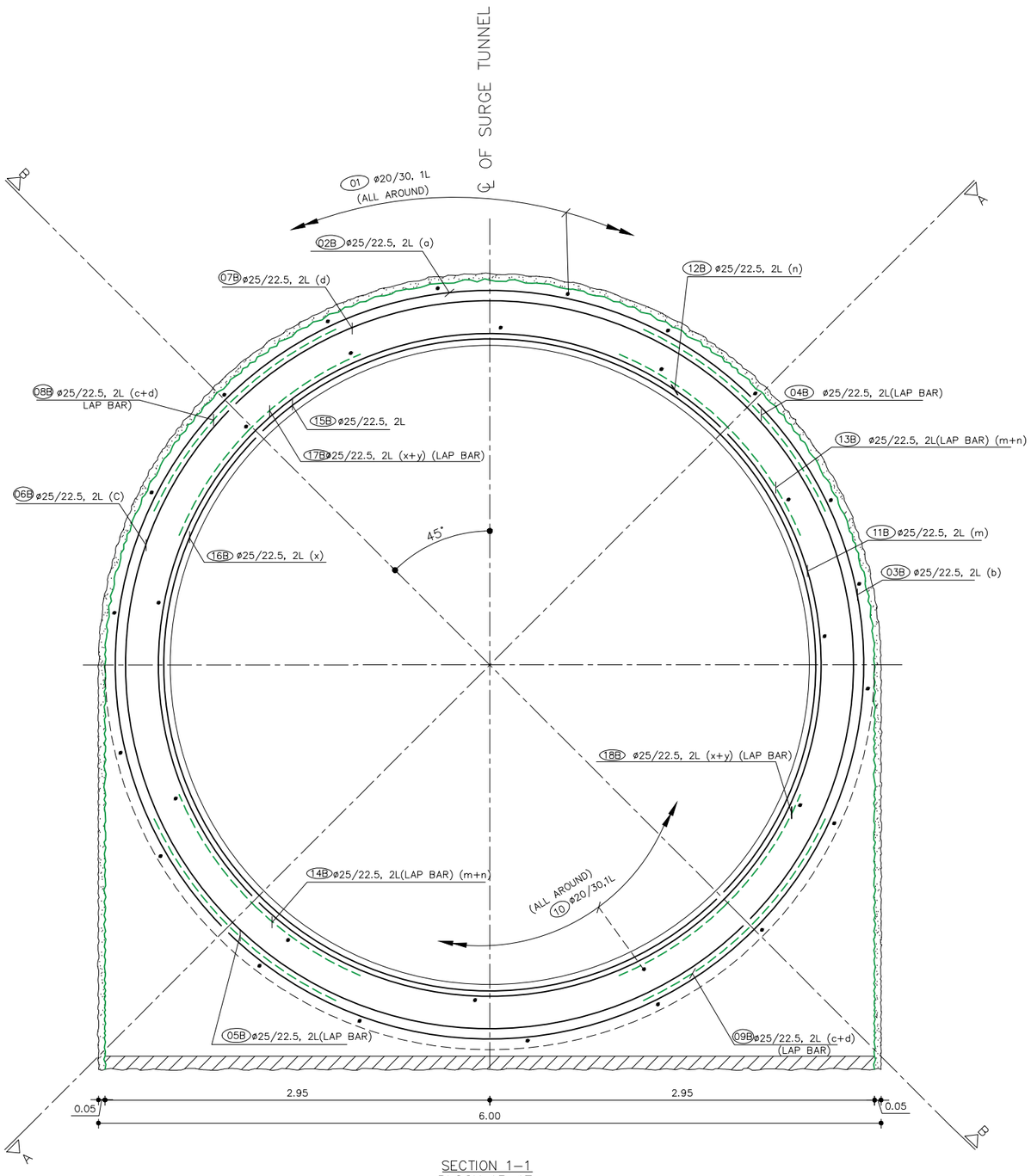
SURGE TUNNEL
CONCRETE LINING
BLOCK 12
CH.0+131.13~CH.0+119.13
REINFORCEMENT EXECUTION DRAWING

NOT TO SCALE

Drwg. No.: UTK-032064-ST-CL- BS-1201 REV.

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK-032064-ST-CL-BP-01 Rev-A for block plan.

LEGEND:
-//-//- Construction Joint
—■— Coupler



SECTION 1-1
BLOCK 13~17
SCALE 1:20

SCALE 1:20
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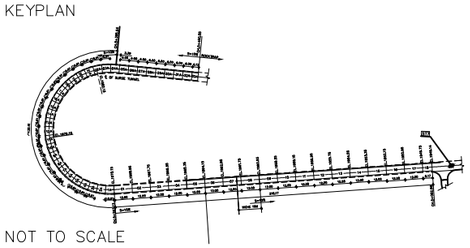
KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

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Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

Drwg. Ref. :

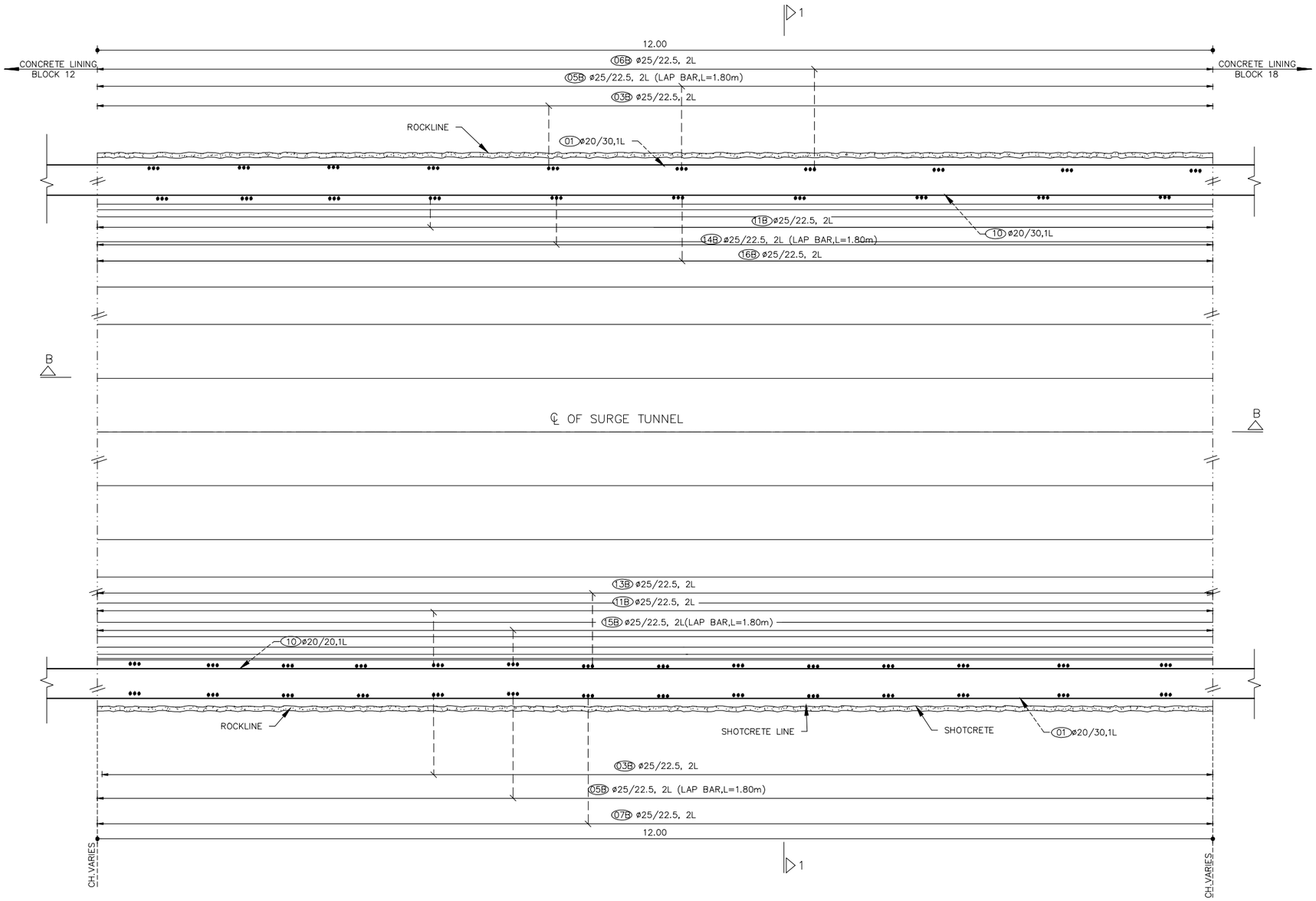
SURGE TUNNEL
CONCRETE LINING
BLOCKS 13~17
CH.0+131.13~CH.0+059.13
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:20
Scale A3 1:40

Drwg. No.: UTK-032064-ST-CL- R-1301 REV.

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK-032064-ST-CL-BP-01 Rev-A for block plan.

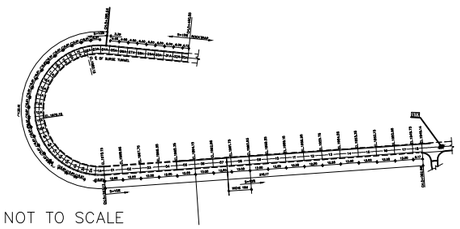
LEGEND:
-//-//- Construction Joint
—■— Coupler



SECTION A-A
BLOCK 13~17
SCALE 1:25

SCALE 1:25
-0.25 0 0.25 0.50 0.75 1.00 1.25 [m]

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

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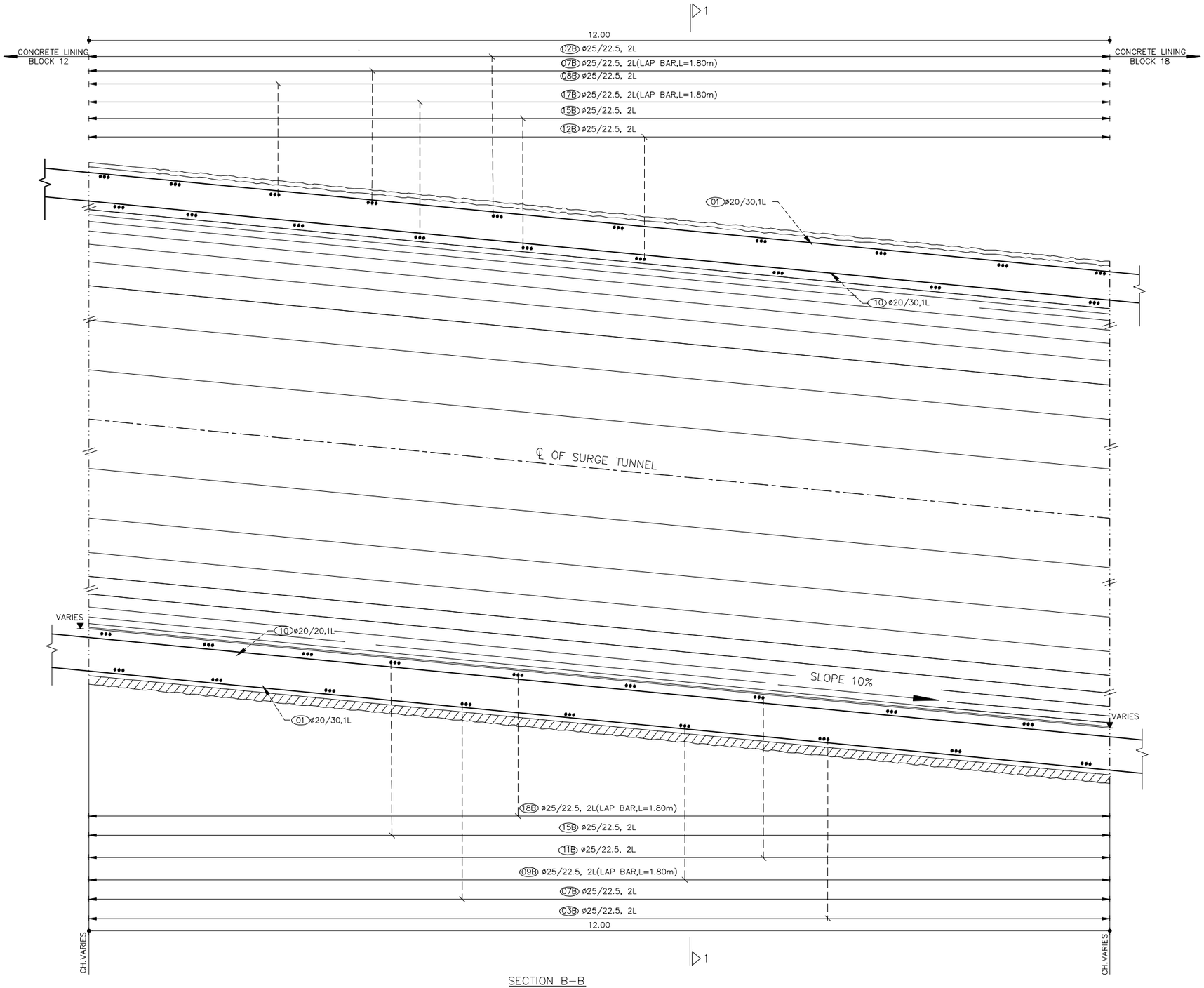
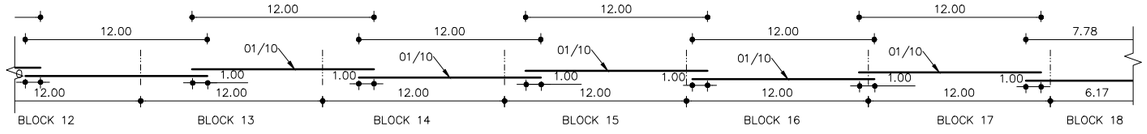
Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCKS 13~17
CH.0+131.13~CH.0+059.13
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:25
Scale A3 1:50

Drwg. No.: UTK-032064-ST-CL- R-1302 REV.



SECTION B–B
BLOCK 13~17
SCALE 1:25



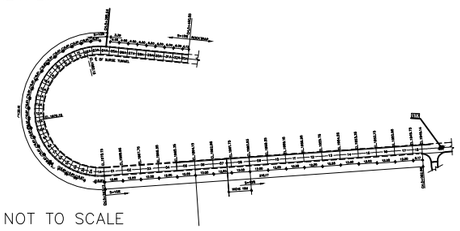
BAR 01/10
1ST LAYER

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK–032064–ST–CL–BP–01 Rev–A for block plan.

LEGEND:
–//–//– Construction Joint
—■— Coupler

SCALE 1:25
–0.25 0 0.25 0.50 0.75 1.00 1.25 [m]

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK–012065–4520–S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK–012065–4520–Q–011–F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK–012065–4520–S–012–D	HRT To Surge Tunnel,Cross Section
UTK–012065–4520–w 010–A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

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Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCKS 13~17
CH.0+131.13~CH.0+059.13
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:25
Scale A3 1:50

Drwg. No.: UTK–032064–ST–CL– R–1303 REV.

BAR BENDING SCHEDULE OF BLOCK 13~17

Bar No.	Steel size (mm)	Shape (cm)	Clear Length (cm)	Numbers	Couplers/ Laps Nos	Total Length (m)	Weight (kg/m)	Total Weight (kg/block)	No. of block	Total Weight (kg)	Remarks
01	20	1200	1200	61	5*61 nos of laps	732.00	2.47	1808.04	5	9040.20	30cm SPACING
02B	25	900 R=288.00 ∠=179.00°	900	54		486.00	3.86	1875.96	5	9379.80	22.5cm SPACING
03B	25	900 R=288.00 ∠=179.00°	900	54		486.00	3.86	1875.96	5	9379.80	22.5cm SPACING
04B	25	180 R=288.00 ∠=36.00°	180	54		97.20	3.86	375.19	5	1876.00	LAP BAR 22.5cm SPACING
05B	25	180 R=288.00 ∠=36.00°	180	54		97.20	3.86	375.19	5	1876.00	LAP BAR 22.5cm SPACING
06B	25	900 R=288.00 ∠=179.00°	900	54		486.00	3.86	1875.96	5	9379.80	22.5cm SPACING
07B	25	900 R=288.00 ∠=179.00°	900	54		486.00	3.86	1875.96	5	9379.80	22.5cm SPACING
08B	25	180 R=288.00 ∠=36.00°	180	54		97.20	3.86	375.19	5	1876.00	LAP BAR 22.5cm SPACING
09B	25	180 R=288.00 ∠=36.00°	180	54		97.20	3.86	375.19	5	1876.00	LAP BAR 22.5cm SPACING
10	20	1200	1200	53	5*53 nos of laps	636.00	2.47	1570.92	5	7854.60	30cm SPACING

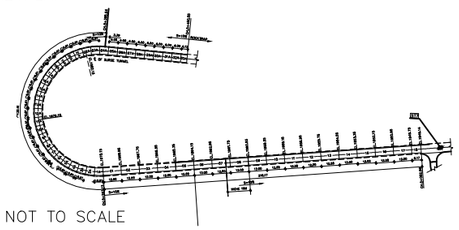
BAR BENDING SCHEDULE OF BLOCK 13~17

Bar No.	Steel size (mm)	Shape (cm)	Clear Length (cm)	Numbers	Couplers/ Laps	Total Length (m)	Weight (kg/m)	Total Weight (kg/block)	No. of block	Total Weight (kg)	Remarks
11B	25	795 R=253.00 ∠=180.00°	795	54		429.30	3.86	1657.10	5	8285.50	22.5cm SPACING
12B	25	795 R=253.00 ∠=180.00°	795	54		429.30	3.86	1657.10	5	8285.50	22.5cm SPACING
13B	25	180 R=253.00 ∠=41.00°	180	54		97.20	3.86	375.19	5	1876.00	LAP BAR 22.5cm SPACING
14B	25	180 R=253.00 ∠=41.00°	180	54		97.20	3.86	375.19	5	1876.00	LAP BAR 22.5cm SPACING
15B	25	795 R=253.00 ∠=180.00°	795	54		429.30	3.86	1657.10	5	8285.50	22.5cm SPACING
16B	25	795 R=253.00 ∠=180.00°	795	54		429.30	3.86	1657.10	5	8285.50	22.5cm SPACING
17B	25	180 R=253 ∠=41.00°	180	54		97.20	3.86	375.19	5	1876.00	LAP BAR 22.5cm SPACING
18B	25	180 R=258.30 ∠=41.00°	180	54		97.20	3.86	375.19	5	1876.00	LAP BAR 22.5cm SPACING

SUMMARY OF BAR BENDING QUANTITY FOR SURGE TUNNEL BLOCK 13~17

Steel size (mm)	Total weight (kg)	Numbers			Weight (kg/no.)			Total Wt.(kg)
		Lap	Coupler	Coupler /Lap for Chair/ spacers	Lap	Coupler	Chair/ spacers	Excl. lap /chair/ spacer
20	16894.80	570	–	–	1407.90	–	–	15486.90
25	85669.20							85669.20
Total	102564.00							101156.10

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

	Name	Date	Notes

☐ Approved ☐ Approved as noted ☐ Return for correction ☐ For Information

DATE: ..... SIGNATURE: .....
ENGINEER – JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		09.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

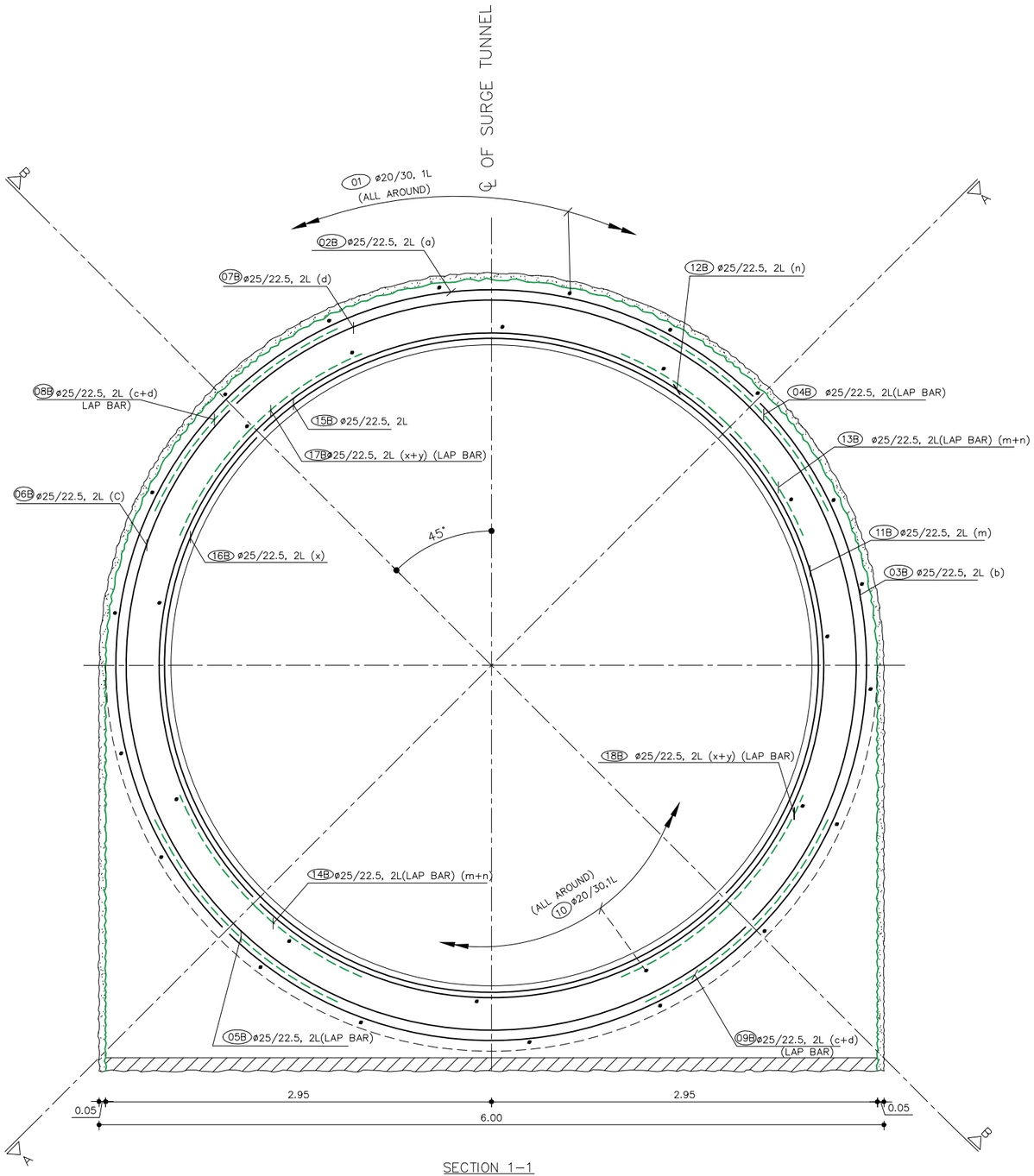
Drwg. Ref. :

SURGE TUNNEL
CONCRETE LINING
BLOCK 13~17
CH.0+131.13~CH.0+059.13
REINFORCEMENT EXECUTION DRAWING

NOT TO SCALE | Drwg. No.: UTK-032064-ST-CL- BS-1301 | REV.

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK-032064-ST-CL-BP-01 Rev-A for block plan.

LEGEND:
-//-//- Construction Joint
—■— Coupler



SECTION 1-1
BLOCK 18
SCALE 1:20

SCALE 1:20
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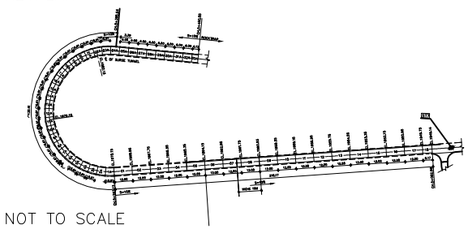
KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

Name	Date	Notes

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UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

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Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

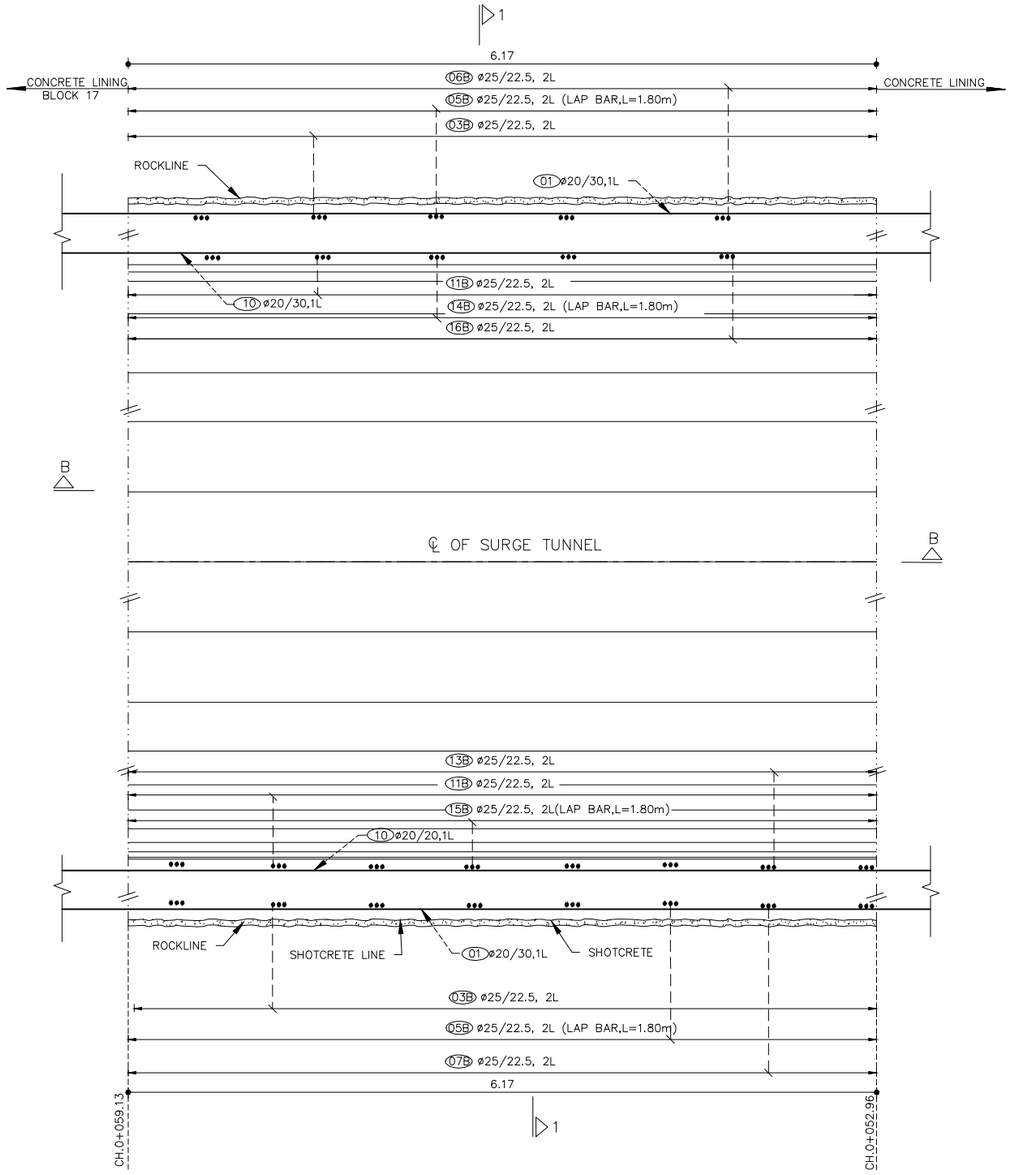
Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCK 18
CH.0+059.13~CH.0+052.96
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:20
Scale A3 1:40

Drwg. No.: UTK-032064-ST-CL- R-1801 REV.

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK-032064-ST-CL-BP-01 Rev-A for block plan.

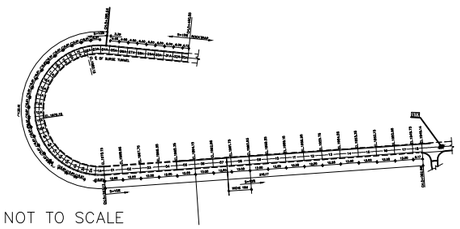
LEGEND:
-//-//- Construction Joint
Coupler



SECTION A-A
BLOCK 18
SCALE 1:25

SCALE 1:25
-0.25 0 0.25 0.50 0.75 1.00 1.25 [m]

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

	Name	Date	Notes

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UTKHPL

ENGINEER JV NL
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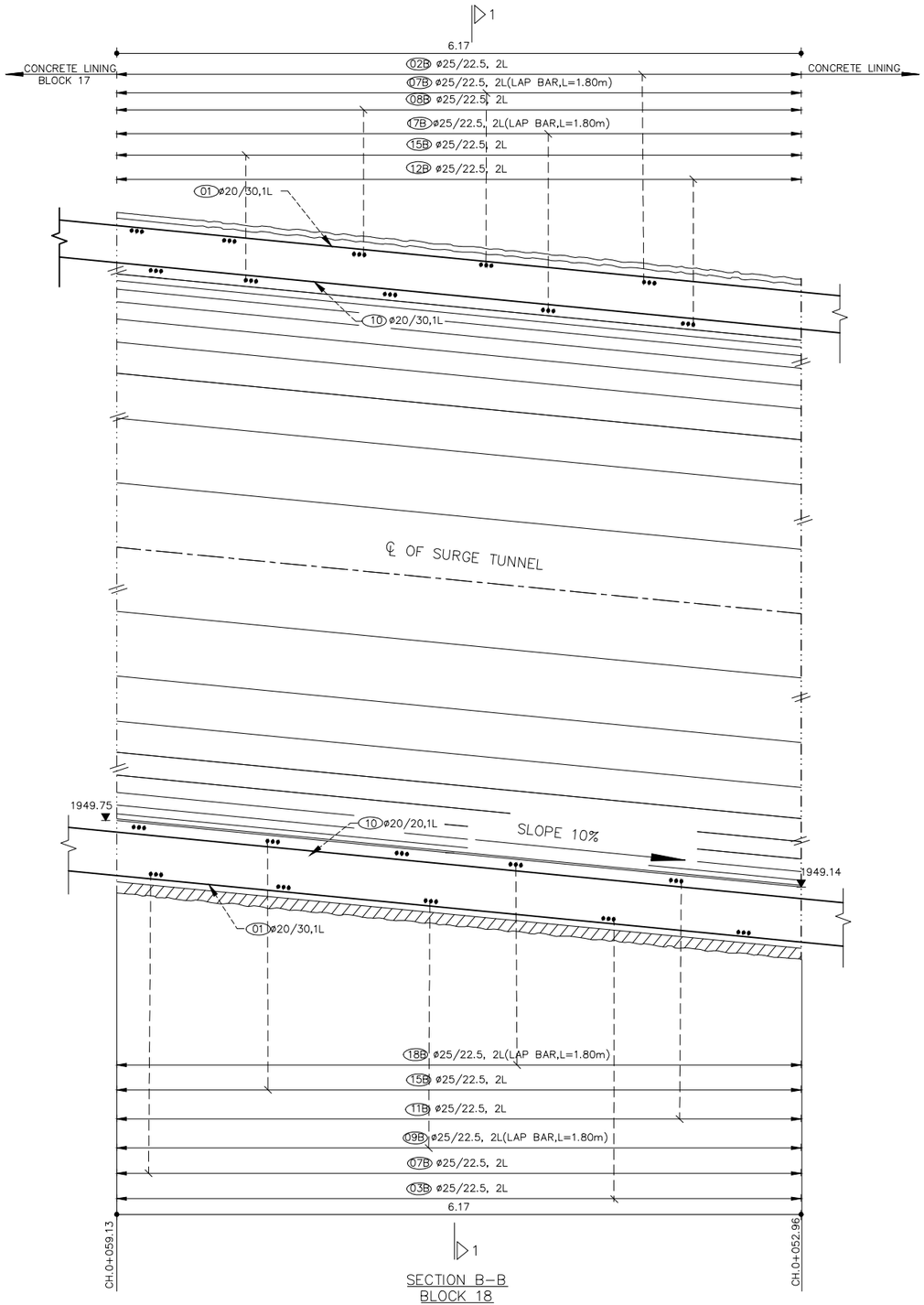
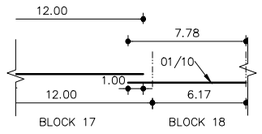
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCK 18
CH.0+059.13~CH.0+052.96
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:25
Scale A3 1:50
Drwg. No.: UTK-032064-ST-CL- R-1802
REV.



SECTION B–B
BLOCK 18
SCALE 1:25



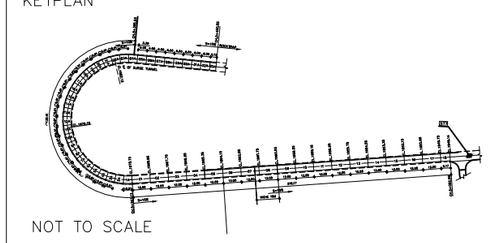
BAR 01/10
1ST LAYER

NOTES:
1. Dimensions are in meters(m) unless otherwise specified.
2. All elevations are in masl.
3. Refer UTK–032064–ST–CL–BP–01 Rev–A for block plan.

LEGEND:
–//–//– Construction Joint
Coupler

SCALE 1:25
–0.25 0 0.25 0.50 0.75 1.00 1.25 [m]

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK–012065–4520–S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK–012065–4520–Q–011–F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK–012065–4520–S–012–D	HRT To Surge Tunnel,Cross Section
UTK–012065–4520–w 010–A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

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ENGINEER – JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL
CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor:

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Drawn	Jan Jiwan		09.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

Drwg. Ref. :
SURGE TUNNEL
CONCRETE LINING
BLOCK 18
CH.0+059.13~CH.0+052.96
REINFORCEMENT EXECUTION DRAWING

Scale A1 1:25
Scale A3 1:50

Drwg. No.: UTK–032064–ST–CL– R–1803 REV.

BAR BENDING SCHEDULE OF BLOCK 18

Bar No.	Steel size (mm)	Shape (cm)	Clear Length (cm)	Numbers	Couplers/ Laps Nos	Total Length (m)	Weight (kg/m)	Total Weight (kg/block)	No. of block	Total Weight (kg)	Remarks
01	20	778	778	61	61 nos of laps	474.58	2.47	1172.21	1	1172.21	30cm SPACING
02B	25	900 R=288.00 ∠=179.00°	900	28		252.00	3.86	972.72	1	972.72	22.5cm SPACING
03B	25	900 R=288.00 ∠=179.00°	900	28		252.00	3.86	972.72	1	972.72	22.5cm SPACING
04B	25	180 R=288.00 ∠=36.00°	180	28		50.40	3.86	194.55	1	194.55	LAP BAR 22.5cm SPACING
05B	25	180 R=288.00 ∠=36.00°	180	28		50.40	3.86	194.55	1	194.55	LAP BAR 22.5cm SPACING
06B	25	900 R=288.00 ∠=179.00°	900	28		252.00	3.86	972.72	1	972.72	22.5cm SPACING
07B	25	900 R=288.00 ∠=179.00°	900	28		252.00	3.86	972.72	1	972.72	22.5cm SPACING
08B	25	180 R=288.00 ∠=36.00°	180	28		50.40	3.86	194.55	1	194.55	LAP BAR 22.5cm SPACING
09B	25	180 R=288.00 ∠=36.00°	180	28		50.40	3.86	194.55	1	194.55	LAP BAR 22.5cm SPACING
10	20	778	778	53	53 nos of laps	412.34	2.47	1018.48	1	1018.48	30cm SPACING

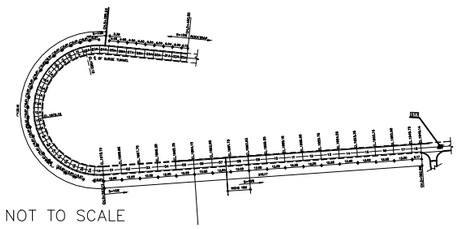
BAR BENDING SCHEDULE OF BLOCK 18

Bar No.	Steel size (mm)	Shape (cm)	Clear Length (cm)	Numbers	Couplers/ Laps	Total Length (m)	Weight (kg/m)	Total Weight (kg/block)	No. of block	Total Weight (kg)	Remarks
11B	25	795 R=253.00 ∠=180.00°	795	28		222.60	3.86	859.23	1	859.23	22.5cm SPACING
12B	25	795 R=253.00 ∠=180.00°	795	28		222.60	3.86	859.23	1	859.23	22.5cm SPACING
13B	25	180 R=253.00 ∠=41.00°	180	28		50.40	3.86	194.55	1	194.55	LAP BAR 22.5cm SPACING
14B	25	180 R=253.00 ∠=41.00°	180	28		50.40	3.86	194.55	1	194.55	LAP BAR 22.5cm SPACING
15B	25	795 R=253.00 ∠=180.00°	795	28		222.60	3.86	859.23	1	859.23	22.5cm SPACING
16B	25	795 R=253.00 ∠=180.00°	795	28		222.60	3.86	859.23	1	859.23	22.5cm SPACING
17B	25	180 R=253 ∠=41.00°	180	28		50.40	3.86	194.55	1	194.55	LAP BAR 22.5cm SPACING
18B	25	180 R=258.30 ∠=41.00°	180	28		50.40	3.86	194.55	1	194.55	LAP BAR 22.5cm SPACING

SUMMARY OF BAR BENDING QUANTITY FOR SURGE TUNNEL BLOCK 18

Steel size (mm)	Total weight (kg)	Numbers			Weight (kg/no.)			Total Wt.(kg)
		Lap	Coupler	Coupler /Lap for Chair/ spacers	Lap	Coupler	Chair/ spacers	Excl. lap /chair/ spacer
20	2190.69	114	–	–	281.58	–	–	1909.11
25	8884.20							8884.20
Total	11074.89							10793.31

KEYPLAN



NOT TO SCALE

Reference Drawings

Drwg. No.	Title
UTK-012065-4520-S 010_D	Surge System, Surge Tunnel, Layout Plan
UTK-012065-4520-Q-011-F	Surge System, HRT To Surge Tunnel, Longitudnal Section
UTK-012065-4520-S-012-D	HRT To Surge Tunnel,Cross Section
UTK-012065-4520-w 010-A	Surge Tunnel,Cross Section, Reinforcement Drawing

Revisions

	Name	Date	Notes

☐ Approved ☐ Approved as noted ☐ Return for correction ☐ For Information

DATE: ..... SIGNATURE: .....
ENGINEER – JVNL

UPPER TAMAKOSHI HYDROPOWER LIMITED
Kathmandu,Nepal
UTKHPL

ENGINEER JV NL CONTRACTOR SINOHYDRO CORPORATION LIMITED

UPPER TAMAKOSHI HYDROELECTRIC PROJECT

Contractor: Drwg. Ref. :

	Cad. Sign.	Orig.Sign.	Date
Drawn	Jan Jiwan		09.03.2019
Checked	S. Gautam		
Verified			
Approved	Sheng D.F.		

SURGE TUNNEL
CONCRETE LINING
BLOCK 18
CH.0+059.13~CH.0+052.96
REINFORCEMENT EXECUTION DRAWING

NOT TO SCALE Drwg. No.: UTK-032064-ST-CL- BS-1801 REV.